

WHAT IS CLAIMED IS:

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1. An electroporation assembly comprising:
a container having a distal opening, the container configured to receive a
5 conductive fluid including a substance;
a first electrode having at least a portion configured to be disposed within
the container and in direct electrical communication with the conductive fluid; and
a second electrode positioned in proximity to the distal opening for
creating an electric field between the electrodes.
- 10 2. An electroporation assembly according to claim 1 wherein the
container is selected from the group consisting of pipette, buret and syringe.
- 15 3. An electroporation assembly according to claim 2 wherein the pipette
is a micropipette.
- 20 4. An electroporation assembly according to claim 3 wherein the
micropipette is a glass pulled pipette having a sharp tip opening having a diameter less
than the diameter of a target cell.
- 25 5. An electroporation assembly according to claim 1 further comprising a
tissue support for maintaining a cell, tissue or an organism between the distal opening
and the second electrode.
- 30 6. An electroporation assembly according to claim 1 further comprising a
power supply.
7. An electroporation assembly according to claim 6 wherein the power
supply is a periodic pulse generator.

8. An electroporation assembly according to claim 1 wherein the first and second electrodes are independently made of a conductive material selected from the group consisting of silver, copper, stainless steel, aluminum, platinum, gold, carbon and alloys thereof.

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Claim 8

9. A method for delivering a substance into a cell comprising:
providing a container having a distal opening;
placing a conductive fluid including a substance in the container;
placing the distal opening in proximity to the cell; and
causing an electrical signal to pass through the conductive fluid and the cell wherein the substance passes through the distal opening and enters the cell.

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10. A method for delivering a substance into a cell according to claim 9 wherein the container is selected from the group consisting of pipette, buret and syringe.

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11. A method for delivering a substance into a cell according to claim 10 wherein the pipette is a micropipette.

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12. A method for delivering a substance into a cell according to claim 11 wherein the micropipette is a glass pulled pipette having a sharp tip opening having a diameter less than the diameter of the cell.

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13. A method for delivering a substance into a cell according to claim 9 wherein the electrical signal passes between first and second electrodes, the first electrode having at least a portion thereof disposed within the container and in direct electrical communication with the conductive fluid.

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14. A method for delivering a substance into a cell according to claim 9 wherein the cell is in direct contact with the distal opening.

15. A method for delivering a substance into a cell according to claim 9
wherein the substance is selected from the group consisting of nucleic acid, dye, protein,
antibody, antigen, peptide, metal, pharmaceutical compound, a radiolabeled derivative of
the foregoing and combinations thereof.

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16. A method for delivering a substance into a cell according to claim 15
wherein the nucleic acid is contained in a vector.

10 17. A method for delivering a substance into a cell according to claim 15
wherein the dye is a fluorochrome.

15 18. A method for delivering a substance into a cell according to claim 15
wherein the protein is a fluorochrome.

15 19. A method for delivering a substance into a cell according to claim 18
wherein the protein is green fluorescent protein or a red shifted mutant thereof.

20 20. A method for delivering a substance into a cell according to claim 15
wherein the nucleic acid is a nucleic acid encoding a fluorescent protein.

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21. A method for delivering a substance into a cell according to claim 20
wherein the fluorescent protein is green fluorescent protein or a color shifted mutant
thereof.

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22. A method for delivering a substance into a cell according to claim 9
wherein the electrical signal is generated by a periodic pulse generator.

23. A method for delivering a substance into a cell according to claim 22
wherein the electrical signal is a square pulse.

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24. A method for delivering a substance into a cell according to claim 23
wherein the electrical signal is a high frequency train of square pulses.

25. A method for delivering a substance into a cell according to claim 22
5 wherein the electrical signal is an exponential decay pulse.

26. A method for delivering a substance into a cell according to claim 9
wherein the cell is a neuron.

10 27. A method for delivering a substance into a cell according to claim 9
wherein the cell is a brain cell selected from the group consisting of neuron and glial cell.

28. A method for delivering a substance into a cell according to claim 9
wherein the method is conducted *in vivo*.

15 29. A method for delivering a substance into a cell according to claim 9
wherein the method is conducted *in vitro*.

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